Paper Summaries

Arka Sadhu

September 19, 2017

Contents

1 QRS Analysis Algos

1.1 Signal Derivatives and Digital Filters

- Typical f components in the range of 10-25 Hz, so most algos use a filter bank to attenuate other signal artifacts from P,T waves, baseline drift, incoupling noise.
- For P,T waves use high pass filtering, for incoupling noise actually need a low pass filter, giving a bandpass filter from 10-25 Hz.
- Some do it separately , some only take the high pass part of it.
- Most algos use some kind of decision rules to reduce the number of false positives.

1.1.1 Derivative Based Algos

- HPF realized as a differentiator. Mostly first order, some also second order. Some cases a linear combination as well.
- Detection by comparing the feature against a threshold.
- Also complemented by heuristically found features

1.1.2 Digital Filters

- Two different lpf with different cut-off freq, subtraction gives bpf.
- Passed onto simple m+-time step averaging.
- MOBD (multiplicatio of backward difference) : kind of AND all algorithm and some consistency conditions.
- Simple peak detection search by comparing the max and following till v/2 of the signal. Mark the highest peak.
- Do a form of lc of peak level and simple noise level and update, eventually threshold reached.
- Another method : max of each segment compared to an adaptive noise level and adaptive peak estimate and classified depending on distance to each other.
- Generalized digital filters also proposed.

1.2 Wavelet, Singularity, Filter Bank

- Use wavelet transform, in some sense similar to stft. Use discrete wavelet transform.
- 32 band filter bank used to downsample subband signals.

1.3 Neural Network Based Methods